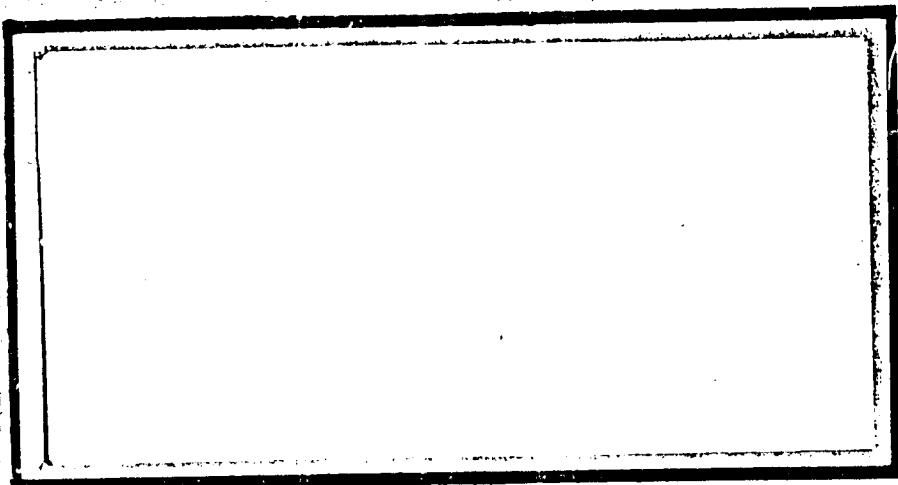


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MILCON USER'S GUIDE

THESIS

Neil S. Whiteman
Captain, USAF

AFIT/GEM/DEM/88S-20

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MILCON USER'S GUIDE

THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Engineering Management

Neil S. Whiteman, B.S.

Captain, USAF

September 1988

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Abstract

The purpose of this study was to develop a MILCON User's Guide that could be readily used in the operational Air Force. The guide is intended to reduce the amount of user generated change orders during the design and construction phases of the MILCON process. This can only be accomplished through user education in the MILCON process and increased user involvement during the initial phases of the MILCON process. The MILCON User's Guide should be used to motivate the user to become intensely involved in the MILCON project from the beginning.

MILCON USER'S GUIDE

I. Introduction

Background

Air Force facility design and construction are accomplished through the Military Construction Program (MILCON - previously known as MCP). A MILCON project "... starts when a requirement for a facility is identified and ends with a completed facility that hopefully satisfied the requirement" (18:1). The MILCON process consists of five phases:

1. Requirements development
2. Validation
3. Programming
4. Design
5. Construction

The goal of the MILCON process is economical acquisition of quality facilities, on time, and within the budget (1:1). In recent years, changes to MILCON projects have impeded the attainment of this goal. Changes may be requested during any phase of the MILCON process. However, changes to MILCON projects in the last three phases should be avoided (18:1-2):

Changes during the programming phase usually do not pose major problems as they often involve changing the scope of the project. However, this could delay project approval and if the scope change is large and occurs after the project has been approved it could delay or kill the project. Changes during the design phase can cause more significant problems, especially if they require an increase in project scope and/or a major redesign effort. Changes during the construction phase are typically very costly and should be avoided at all costs. Changes during the design and/or construction phases can also cause time delays. Changes during the design phase can also result in possible loss of the project due to increased cost [18:1-2].

General Issue

Congressional concern over project changes during the MILCON process has prompted the Air Force to strive to reduce the number of changes in MILCON projects during the design and construction phases of the process. "Changes are usually needed because the facility, as designed prior to the change, will not meet Air Force needs or because overlooked site problems exist" (18:1). One frequent source of project changes is the user. The user is the organization whose mission the proposed facility will support. Captain Michael Stollbrink noted in his graduate thesis that "By doing a good job in identifying requirements in the programming phase, the user can prevent the need for user generated changes in the design and construction phases" (18:19). A reduction in user generated changes would provide time and cost savings because "Changes create more work for the designer or construction [sic], delay project completion, and cost the Air Force money" (18:1). In fact, an article in the Proceedings of the American Society of Civil Engineers, Journal of the Construction Division states, "Change orders can kill a project if they get out of control" (13:439). Consequently, Stollbrink recommended that a MILCON User's Guide be developed (18:45). Colonel Michael A. McAuliffe, Chief of Programs, Directorate of Engineering and Services at the Air Staff, also supported the development of a MILCON User's Guide (15:1) (see Appendix B).

Specific Issue

Design and construction changes to ongoing Air Force facility construction projects often result in budget overruns. The number of user generated changes to Air Force MILCON projects need to be reduced due to severe budget constraints imposed on the Air Force by Congress. To this end, a MILCON User's Guide should be developed.

Objective

The purpose of this study is to develop a MILCON User's Guide which will describe the specific actions required by users in the MILCON process in order to reduce the need for user generated changes. This user's guide must also educate facility users about the entire MILCON process.

Investigative Questions

What specific information needs to be included in the MILCON User's Guide that will facilitate an increase in the amount and quality of user involvement in the MILCON process? The user's guide should include the following (18:45):

1. A general description of the MILCON process and the purpose of each phase of the MILCON process; requirements development, validation, programming, design, and construction. This description should include a MILCON flowchart which identifies the major events and activities of the process.
2. A definition of the roles of the user, the Base Civil Engineer (BCE), the Major Command (MAJCOM), the Air Force Regional Civil Engineer (AFRCE), the Design and Construction Agent, the Air Staff, the Office of the Secretary of Defense, and Congress.
3. A detailed description of the user's role and required actions during each phase of the MILCON process.
4. A description of the DD Form 1391, Military Construction Project Data, which describes the project scope, cost estimate, facility requirements, current situation, and impact if the facility is not provided. This information constitutes the justification for the project. Approval or disapproval of each MILCON project is based on the information contained in this form.
5. A thorough description of the intense user involvement required to properly justify and design a MILCON project.

6. A description of the project book which includes the purpose of the project book, what it is used for, and the items that the user should consider when developing input to the project book.

7. A definition and description of functional requirements and a checklist for use by the user to ensure consideration of all items that are important and applicable to the project.

II. Methodology

From the outset, it must be noted that this research effort has attempted to synthesize existing knowledge and methodologies concerning the successful implementation of the MILCON with the goal of developing a MILCON User's Guide which meets the objective described in Chapter I. Experience has shown that this knowledge and these methodologies exist in the operational Air Force. The task at hand is to collect this information and integrate it into the MILCON User's Guide. A multi-stage methodology was utilized in performing this research. These stages are described in the order that they occurred.

Literature Review

A literature review of books, journals, regulations, magazine articles, and other research concerning the MILCON process was accomplished. This review included Dayton, Ohio area libraries and a Defense Technical Information Center information search. The purpose of this literature review was to gain an overall understanding of the MILCON process in order to build a framework or detailed outline for the MILCON User's Guide. The detailed information, from the written solicitation described next, could then be incorporated into this framework.

The information gathered through this method was organized into a chronological description of the MILCON process. A chronological organization of the MILCON process was used due to its intuitive appeal. Typically, when a user initiates a MILCON project, he or she must then chronologically move through the process. For this reason, both the literature review and the MILCON User's Guide proceed through the MILCON process chronologically. Finally, similar organization of the literature review and the MILCON User's Guide allowed for easy use of the literature review as an outline for the MILCON User's Guide. Information

gathered through this method is intended to answer all the investigative questions. These questions elicit information that describes the MILCON process: the roles and responsibilities of the participants in the MILCON process, including the user; the forms required; the project book; functional requirements; and the requirement for intense user involvement in the MILCON process.

Advantages. This method of information collection has several advantages. The primary advantage of this method of collecting information is that literature can be screened for applicability to the research before the information is actually collected. The MILCON process has been in existence for a very long time, and subsequently, much literature has been devoted to the subject. There was no cost to this method of collecting information except for the time this student devoted to the literature review. The time required for this type of information collection was moderate, but within the time constraints imposed on this effort.

Disadvantages. There are disadvantages to this method as well. The MILCON is a dynamic and evolving process. Therefore, much of the existing literature on the MILCON process is outdated. Also, this literature review was limited in geographical area. A literature review on the MILCON process in Washington D.C. would have produced better results since that is the location of many participants of the MILCON process (HQ USAF, OSD, Congress). Literature reviews are based on the past. Due to the dynamic nature of the MILCON process, the information gathered and incorporated into the MILCON User's Guide may need adjusted or updated in the future in order to keep the guide current.

The MILCON User's Guide was developed from current information concerning the MILCON process. The focus of this study was toward providing a complete and definitive list of items and events that the facility user must be aware of, participate in, and accomplish in order to successfully acquire new facilities that

meet mission requirements. The guide includes many lessons learned from the operational Air Force.

Written Solicitation

A written request for information was prepared and coordinated through three AFIT offices: LSM, DEM, and DE. The request for information was then forwarded to HQ USAF/LEEP (see Appendix C). There, Major Ed Larsen handled the final preparation of the request for information and obtained the signature of the Air Staff Chief of Programs, Directorate of Engineering and Services, Colonel Michael A. McAuliffe. Major Larsen then collected information for the Air Staff response to the request for information. He sent the signed request for information and the Air Staff response to the request back to AFIT.

This written request for information was then sent to all MAJCOM programming (DEP) and engineering and construction (DEE) offices, and to the AFRCEs. The AFRCEs could then decide who could best respond to the request for information. This written request contained a thorough description of this research effort. The request then asked Air Staff, MAJCOM, and AFRCE personnel to canvass their files and work areas for all existing written information that might be useful to the development of the MILCON User's Guide. Pertinent information was forwarded to AFIT. Specifically, existing written guidance, correspondence, and documentation concerning user involvement in the MILCON process were requested.

This written request was sent to Air Staff, MAJCOM, and AFRCE personnel because they manage the Air Force MILCON. The personnel working in these offices represent the greatest localized collection of MILCON experience in the Air Force. These personnel manage the MILCON day in and day out. They work with the MILCON as a whole and deal with many MILCON projects. They see the

successes in the MILCON, and they also see the problems in the MILCON. These personnel are the ones who answer the MILCON audits and reply to Congressional questions about the MILCON. Finally, these personnel have access to the history of the MILCON in their files.

After the responses to the request were received, the information was reviewed and categorized according to the phase of the MILCON process that the information applied to. Some information submitted applied to multiple phases of the MILCON process and was labeled accordingly. This categorization facilitated easy review of the information for incorporation into appropriate sections of the MILCON User's Guide. Information gathered through this method was intended to answer all the investigative questions.

Advantages. There are several advantages to this method of collecting information. The most important advantage to information collection through written request is access to large numbers of personnel working the MILCON process. Information collection through this written request was quick. All responses were received within two months of mailing out the requests for information. The cost of obtaining this information by mail is minimal. Obtaining the same information by TDY would have cost thousands of dollars. This information could not be collected over the phone due to the large quantity of information collected. This method also allowed for easy collection of information from distant locations.

Disadvantages. There are also some disadvantages to this method of collecting information. The most important limitation of this method is that MILCON users were not included in the request for information. Users were not included in the request for information due to the time constraints imposed on this research effort. The time required to identify MILCON users was considered prohibitive to that action. Also, it was felt that since MILCON users had very

limited exposure to the MILCON process, their input might not be of the quality that was desired. Finally, military moves mean that one project may have many different users throughout the entire MILCON process. Nonetheless, inclusion of MILCON users in the request for information may have provided a significant amount of quality information that could have been useful to this research effort.

Another disadvantage of this method of collecting information is that some of the information collected might not be applicable to the MILCON User's Guide. Others were relied upon to submit information that they deemed pertinent to this research. A small portion of the information collected by this method might not be useful to the development of the MILCON User's Guide.

Finally, since the MILCON is a dynamic and constantly evolving process, some of the information submitted may be outdated. Since the information submitted is based on the past, it may not be applicable very far into the future. Future policy changes would require adjustment to the MILCON User's Guide.

III. Literature Review

Introduction

The purpose of this literature review is to study the current literature on the MILCON process. Particular emphasis will be given to the examination of the user's role in the MILCON process and to the effect of changes during the MILCON process. AFR 86-1, Programming Civil Engineering Resources, requires that new facilities that cost over \$200,000 must be acquired through the MILCON (6:10). Through the eyes of the facility user, there are five primary phases in the MILCON process - requirements development, validation, programming, design, and construction. The MILCON process "... follows essentially the same pattern for all projects, no matter how the requirements are generated" (12:19). There are no sharp lines dividing these five phases of the MILCON process. In fact, some of the phases overlap.

There are very many players in the MILCON process (5:5-6). "The successful execution of the design and construction process requires teamwork" (5:5). The user is an essential part of the team. "The user is an expert in the use of the building. He may assume that he knows what he wants better than anyone else The user must be a contributing member of the project team" (16:48). "Team effort demands communication" (16:56). "Participants on the team must communicate and be willing to cooperate with one another" (16:52). From the outset, note that communication is fundamental to the MILCON process.

Requirements Development

The MILCON process starts when a facility requirement is identified (18:1). Development of facility requirements is a combined effort between the facility user and the BCE (6:6.1). Detailed instructions for development of facility

requirements are contained in Chapter 1 of AFM 86-2, Standard Facility Requirements (9:1-1). Also, AFM 88-2 contains definitive drawings of many typical Air Force facilities (9:2-2). Specific facility needs must be documented on AF Form 332, BCE Work Request. The using agency's organizational commander must sign the form. The form must then be submitted to the BCE Customer Service Unit (8:31).

Validation

This phase begins with the submission of the AF Form 332 (work request) to the BCE Customer Service Unit. When a work request is submitted to the Customer Service Unit, it must be coordinated with various base agencies that have an interest in the proposed work. For example, the fire department must coordinate on all work requests to ensure that sound fire protection considerations are incorporated into all Air Force construction (17).

After the proper coordination has been completed, the work request is forwarded through the BCE Engineering and Environmental Planning Branch (DEE) office to the BCE Environmental and Contract Planning section (DEEV). The next step in this phase is the presentation of the work request to the base Facilities Board (FB) for approval (17). All MILCON projects must be approved by the FB (6:90). The work request will be evaluated and either approved or disapproved as a valid project by the base FB.

MILCON projects receive validation and priority from the FB. The purpose of the FB is, "To assist civil engineering in establishing, determining priority of, and meeting customer needs . . ." (6:90). The FB operates at the base and MAJCOM level. The FB provides corporate review and recommendations concerning the use of real property facilities and civil engineering resources. "It functions as the ultimate 'decision making' body with regard to contract require-

ments, facilities use, and other real property issues" (7:35). As a corporate body, all major organizations are equally represented on the FB. The FB is charged with making facility decisions that are in the best interest of the base (or MAJCOM) and the Air Force. All organizations have an input into FB decisions. The FB is composed of the following members (6:90):

Base FB

A. Voting Members

1. Chairperson: Installation Commander (establishes the facilities board)
2. Base Civil Engineer
3. Chief; each major staff function or operating agency
4. Commander; each tenant

B. Nonvoting Members: As required by chairperson

MAJCOM FB

A. Voting Members

1. Chairperson: MAJCOM Commander or his appointed representative (establishes the facilities board)
2. MAJCOM DCS/Engineering and Services
3. MAJCOM DCS or Chief; each major staff function or operating agency
4. Others as required by chairperson

B. Nonvoting Members: As required by chairperson

Usually, the FB has a Facilities Working Committee that meets prior to the FB. The Facilities Working Committee reviews all work requests and makes recommendations to the FB concerning those work requests (7:37; 17). "The purpose of this meeting is to develop recommendations for the FB and 'flush out' problem areas and provide opportunity to resolve conflicts before the FB meeting" (7:37).

Each work request is presented to the Facilities Working Committee first, and then to the FB for approval. If there is no Facilities Working Committee, then each work request is presented directly to the FB for approval. The major differ-

ence between the Facilities Working Committee and the FB is the Facilities Working Committee is chaired by the BCE, and the FB is chaired by the Base Commander (17). Typically, the FB works on a by exception basis. That is, the FB usually accepts the recommendations of the Facilities Working Committee unless someone objects to a recommendation made by the working committee (3).

The user responsibilities to each board is the same: to be prepared to brief and defend his or her work request at these meetings. The user should be prepared to brief the following aspects of his or her work request (3):

1. Total facility requirement for the assigned mission.
2. The amount and condition of the existing facilities assigned to the using agency - 35mm slides are recommended to depict substandard facilities and conditions.
3. The current situation, or how the using agency is coping with the lack of adequate facilities. What extra actions must the using agency undertake in order to accomplish its mission.
4. The impact on the using agency's mission if new facilities are not provided. How will its mission be affected if the work request is not approved.
5. Any additional factors relevant to the work request.

If the work request is approved by the FB, then the work request formally becomes a MILCON project. DEEV will assign a project number to the project and begin preparation of a DD Form 1391, Military Construction Project Data (17).

Programming

The BCE initiates the programming phase of the MILCON process with the preparation of a DD Form 1391, Military Construction Project Data. This document explains and justifies the facility requirement. "It is the user's responsibility to provide a description of his functional facility needs to the Base Civil Engineer's project programmer. Often, the user is unaware of this responsibility" (18:10). Once completed, the DD Form 1391 is forwarded to the MAJCOM (6:31).

After MAJCOM approval, the DD Form 1391 is submitted to HQ USAF, Engineering and Services. If the project is approved by HQ USAF, a Design Instruction (DI) is issued because it is "... the desire of Congress to have design of projects substantially underway prior to requesting authorization and appropriation" (4:4-3). This DI typically authorizes the design agent to proceed to 35% design. "The DI informs the MAJCOM, the base, and the responsible AFRCE to proceed with the design of the project" (2:14).

Referring to lecture material distributed in MGT 423, AFIT School of Civil Engineering and Services Project Programming Course, Captain Michael Stollbrink noted,

If the DD form 1391 is validated by the MAJCOM, the host base prepares a project book for each facility. The project book is a document containing data, criteria, functional requirements and costs to support programming and design of facility projects. The purpose of the project book is to provide all functional design criteria to be used in the MCP design process. A thorough project book considers all requirements. It increases the probability of getting the best possible facility at minimum cost and with the least amount of change [18:10-11].

Stollbrink also pointed out that

The user plays an important role in the development of the project book. The user's input to the project book is critical because it is here that he must identify the functional requirements that will later form the basis of design. The user's input should include a complete functional description of the facility. If the user provides a quality description of his functional requirements for the project book, the rest of his involvement in the MCP process will be minimal. The Base

Civil Engineer must insure that the project includes a thorough description of the user's functional requirements [18:11].

"If the user does a good job in communicating his needs, there will be less potential for future contract changes" (18:15).

Once the project book has been completed, it is sent to the MAJCOM for review and approval (10:18). Then, it is transmitted to three primary users (MILCON players).

The first user, HQ USAF/PREE [LEEE], requires cost estimates and supporting data sufficient to analyze the validity of the PA and to develop the Congressional proposal. The second two users, the AFRCE and the design agent, are interested in a clear, complete and thorough statement of functional guidance for the design effort [4:6-2].

Design

The design phase begins when HQ USAF issues the DI. After the AFRCE receives the DI, it forwards it and the project book to the design agent. "The design agent then proceeds with in-house design or selects an Architect-Engineer (AE) firm to accomplish the design. Normally the AE is authorized only to complete the design to the 30% level. The design is then submitted for review" (2:15).

At this point, the user should review the design to insure the proposed facility meets his functional requirements as described in the project book. The user should direct any questions on the 30% drawings and specifications to the Base Civil Engineer (BCE). The BCE should act as a user consultant and provide help in understanding the drawings and specifications. The user should not be concerned with technical requirements during the design review; this is the responsibility of the design agent. Functional requirements are characteristics that the user needs in the facility and technical requirements involve the methods and physical techniques the designer uses to provide these characteristics. After the review, the design is considered 35% complete [18:13].

If the project is disapproved by Congress, "the project must be reprogrammed for the next budget cycle and design work is terminated" (2:16). If the project is approved by Congress, design will then proceed to 95%. Another review is held

at this point. "On projects with major changes made at the 35% design point, a review may also be held at 60% design. Here again, the user should become involved to insure that the proposed design meets his functional requirements" (18:13).

The AFRCE may approve the following changes during the design phase of the MILCON process (18:14-15):

1. A 10% change in scope.
2. A 20% change in cost or one million dollars, whichever is less.

"Although the AFRCE has limited authority to approve changes, they should be made only when necessary" (18:14). Congressional concern over changes in the MILCON process is addressed in a 29 Jan 86 letter from the Air Force Vice Chief of Staff. The letter states that "only those changes absolutely necessary to meet the mission should be made after the concept stage (35% design)" (14:1).

Construction

"The user should have very little involvement in the construction phase since he should have already reviewed and approved the final design and identified any problems with the proposed facility" (18:15).

The AFRCE must now wait for HQ USAF authorization to advertise for bids on the construction of the project. After receipt of authorization, the AFRCE notifies the construction agent who releases a request for bids. Normally, the design and construction agent are the same organization (i.e., COE, NAVFAC, AFRCE or MAJCOM). Within a specified time period, a contract is awarded [2:16].

After the construction contract has been awarded, contract changes may be required because of design errors, unforeseen site conditions, changes in requirements, or development of new requirements. Since most changes during construction cause time delays and increase costs, construction changes should

be avoided (11:2-107). "Changes can be especially costly during the construction phase of a project" (18:14).

The user should have very little involvement in the construction phase since he should have already reviewed and approved the final design and identified any problems with the proposed facility. The user might become involved during the construction phase if new user requirements develop during the construction period or if problems with the facility design were not noted until the construction phase [18:15].

Summary

The literature clearly shows that the user plays a very important role in the MILCON process: active user involvement in the MILCON process from the beginning will reduce the likelihood of future project changes. Since changes cost the Air Force time and money, they should be avoided. Therefore, active user involvement is a must in all MILCON projects. This literature also shows that the MILCON is a complex process that involves many varied players such as the Base Civil Engineer, the United States Congress, and facility construction firms. The most important implication of this literature review is that effective participation in the MILCON requires an intimate knowledge of the entire process.

IV. Results

This chapter discusses the results of the literature review and written solicitation. This discussion is focused toward the objective of this research which was to develop a MILCON User's Guide that describes the specific actions required by MILCON users to successfully acquire new facilities that effectively meet the needs of the users.

Literature Review

The purpose of the literature review (Chapter III) was to gain an overall understanding of the MILCON process. The literature review was not intended to provide a detailed narrative of the MILCON process. Rather, the literature review was intended to provide a framework or detailed outline for the MILCON User's Guide. This framework could then be filled in with the detailed information obtained from the written solicitation.

Analysis of the literature showed that, from the perspective of the user, there are five fairly distinct phases to the MILCON process: requirements development, validation, programming, design, and construction.

The literature review uncovered the major events and activities that take place in each phase of the MILCON process. The five phases and the events and activities associated with each phase combined to form the desired framework of the MILCON process. This framework provided the outline for the MILCON User's Guide.

Written Solicitation

A written request for information was sent to all MAJCOM programming (DEP) and engineering and construction (DEE) offices, to the AFRCEs, and to the

Air Staff. Of the 35 offices that received these requests, 22 offices responded. This translates into a 63 percent response rate. The high response rate is attributable to high level endorsement of this research (see Appendix B).

A wide variety of information was submitted. One common theme throughout the responses was clear: intense user involvement, from the beginning, is the key to a successful MILCON project. The responses from the field welcomed, with great anticipation, the development of a MILCON User's Guide as an avenue toward increased user involvement in the MILCON process.

In addressing the investigative questions, the responses to the written solicitation were reviewed and categorized by which phase of the MILCON process they applied to. Much of the information submitted applied to multiple phases of the MILCON process and was labeled accordingly.

In developing the MILCON User's Guide, the literature review (Chapter III) provided the initial outline for the guide. The data gathered by the written solicitation was organized according to this outline. Organization of this information similar to the already developed outline for the MILCON User's Guide made it easy to incorporate the information into the appropriate sections of the guide.

As already noted, the MILCON process is very complex, and a lot of information is available on this process that is not pertinent to the user. For instance, the user does need to know the details of how the construction agent obtains a construction contract for a MILCON project. The user only needs to know that the construction agent is responsible for obtaining that contract. The first analysis of any data considered for inclusion in the MILCON User's Guide was whether or not the user needed to know that specific information. Would the information impact the user's functioning or movement through the MILCON process?

When information was determined to be applicable to the MILCON User's Guide, the next decision was where in the guide to place the information. This

was an easy task since the information had already been organized similarly to the outline for the MILCON User's Guide.

This process was continued until all information submitted had been reviewed, categorized, and analyzed for applicability to the MILCON User's Guide. Applicable data was incorporated into the guide. As intended, information collected through this method answered all the investigative questions. This information describes the MILCON process; the roles and responsibilities of the participants in the MILCON process, including the user; the forms required; the project book; and functional requirements. It also emphasizes the requirement for intense user involvement in the MILCON process.

MILCON User's Guide

The development of the MILCON User's Guide was the objective of this research effort. The MILCON User's Guide is presented in Appendix A. This guide leads the MILCON user through the entire MILCON process, from the beginning to the end. The guide also describes the general responsibilities of all of the participants in the MILCON process. The theme of the MILCON User's Guide reflects the theme of the field responses to the written solicitation: intense user involvement, from the beginning, is the key to a successful MILCON project. The guide describes all of the activities and events of the MILCON process that the user must be aware of, participate in, and accomplish in order to successfully acquire a new facility that effectively meets the needs of the user.

V. Conclusions and Recommendations

This chapter summarizes the conclusions that can be drawn from this research effort. Based on these conclusions, three recommendations are made. Finally, some areas for further research are suggested.

Conclusions

Based on the literature review and responses to the written request for information, the following conclusions can be drawn.

1. User involvement, from the beginning, is the key to a successful MILCON project. A successful MILCON project is one that achieves timely acquisition of a new facility that effectively meets the needs of the user.
2. The MILCON process is long and complex. For the user to effectively participate in the MILCON process, education about that process is necessary. MILCON users need education about their roles and responsibilities throughout the entire MILCON process.
3. The current level of user involvement in the MILCON process is inadequate. This results in too many user requested changes during the design and construction phases of the MILCON process. Reducing the amount of user generated changes during the MILCON process would save the Air Force significant amounts of time and money.

Recommendations

The following recommendations, based on the results and conclusions of this research, are offered for consideration.

1. Air Force wide publication of the MILCON User's Guide as an official Air Force Pamphlet. This would ensure availability of the guide to all MILCON users.

2. An alternative to publication of the MILCON User's Guide as an official Air Force Pamphlet is distribution of the guide along Civil Engineering functional lines. The guide could be forwarded to MAJCOMs with broad instructions for distribution. MAJCOMs could then tailor the MILCON User's Guide to meet their specific requirements. Then, the command tailored guide could be forwarded to the bases with instructions for distribution. Distribution of the MILCON User's Guide at the base level should be in a manner that will ensure that the guide is readily available to all current, proposed, and possible MILCON users.

3. The MILCON User's Guide could be adopted as part of the course material for the AFIT School of Civil Engineering and Services short course, MGT 423, Project Programming. This would help ensure that base level programmers are aware of the MILCON User's Guide. The purpose, usefulness, and implementation of the MILCON User's Guide could be explained to the students in this course.

Recommendations for Further Study

As a result of this research, the following recommendations for further study are made:

1. As the MILCON process evolves, the MILCON User's Guide will require adjustment to remain current.
2. Performance of studies similar to this one could be carried out to validate this study. Such research may uncover additional information that needs to be incorporated into the MILCON User's Guide.

APPENDIX A:
MILCON
USER'S
GUIDE

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I
INTRODUCTION

I. Introduction

This guide has been written for you, the facility user. It will lead you through the Military Construction Program (MILCON) process, from the beginning to the end. Keep this guide handy for quick reference.

The objective of this guide is to provide a comprehensive, understandable description of the development, programming, design, and construction of Air Force MILCON projects. This guide will explain who does what and when they do it. The guide provides an overview of the responsibilities of all the participants in the MILCON process. The guide provides a description of the events and activities that the user must be aware of, participate in, and accomplish in order to successfully acquire a new facility. The guide also describes the critical milestones that must be met and outlines the path a project must traverse for successful completion.

The goal of the MILCON process is to provide the Air Force with functional facilities on time at a reasonable cost. A functional facility is a facility that efficiently and effectively meets the needs of the user. Attainment of this goal requires a dedicated effort by all of the participants in the MILCON process, especially you, the facility user.

The MILCON is a very complex process. It begins and ends with you, the facility user. However, it is a long process and there are many varied players involved in this process, from base level all the way to Congress. The MILCON ultimately requires Congressional authorization and appropriation of funds. The key to the success of this complicated process is teamwork. Team effort demands USER INVOLVEMENT. Team effort also demands communication. Maintaining open lines of communication throughout the MILCON process is essential to the construction of a facility that meets your needs.

This information in this guide will, in general, apply to all MILCON projects in the Continental United States (CONUS). However, specific projects may have unique procedures or requirements that are not outlined in this guide. Also, certain MAJCOMs have developed command specific procedures for the MILCON that are not included in this guide. This guide will assist MILCON facility users in understanding the MILCON process and successfully acquiring new facilities through the MILCON process.

This guide is the result of an 1988 AFIT Master's thesis by Captain Neil S. Whiteman. The guide was developed by synthesizing existing written information concerning the MILCON that was collected from the Air Staff, MAJCOMs, and AFRCE's.

II

**GENERAL
RESPONSIBILITIES**

II. General Responsibilities

Introduction

The MILCON is a complex process with many players. Successful execution of the MILCON process results in the economic and timely acquisition of a new facility which meets the user's needs and is easily maintained. This requires teamwork and open communication among all the parties involved. Each player in the MILCON process has differing responsibilities. These responsibilities must be carried out in order to acquire a new facility that meets the needs of the user. This chapter presents an overview of these responsibilities.

Using Agency (User)

The user is one of the most participants in the MILCON process. After all, the facility is being constructed for the user at great expense to the Air Force and the American taxpayers. More than ever before, the Air Force must insure that its funds are spent economically and efficiently. The user has many responsibilities which are detailed throughout the remainder of this guide. The user's responsibilities begin with identification of a facility need and end with acceptance of the completed facility. This guide will detail all of the user's responsibilities throughout the MILCON process in chronological order.

The primary responsibility of the user is early identification of facility requirements that must be incorporated into the new facility.

Base Civil Engineer (BCE)

The BCE implements design and construction management policies delegated by the MAJCOM. The BCE has many responsibilities throughout the MILCON process. THE BCE IS THE FOCAL POINT FOR THE FACILITY USER THROUGHOUT THE MILCON PROCESS. The BCE's goal in the MILCON process is customer satisfaction. The BCE will help you obtain a functional facility that meets your mission needs. Other specific responsibilities of the BCE include project identification to MAJCOM, programming, Project Book (PB), functional design review, construction surveillance, and submitting user change proposals to MAJCOMs.

Major Command (MAJCOM)

The MAJCOM Deputy Chiefs of Staff for Engineering and Services provide planning, design, and construction project management for the MILCON. The using agency's counterpart at the MAJCOM level represents user interests and requirements to the MAJCOM Facilities Board.

Air Force Regional Civil Engineer (AFRCE)

The AFRCE serves as a field extension of the Director of Engineering and Services to assist in managing the design and construction of Air Force MILCON projects. The primary function of the AFRCE is to ensure quality design and construction that is on time and within the budget. The AFRCE is also the funds manager for MILCON projects. In the CONUS, there are four AFRCEs: Eastern

Region (AFRCE-ER) in Atlanta, GA; Central Region (AFRCE-CR) in Dallas, TX; Western Region (AFRCE-WR) in San Francisco, CA; Strategic Air Command (AFRCE-SAC) at Offut AFB NE; and Tactical Air Command (AFRCE-TAC) at Langley AFB VA. The AFRCE is the design and construction manager for the Air Force. All design and construction issues will generally be settled by the AFRCE. User contact with the AFRCE is through the BCE and MAJCOM.

Agent

Both the design agent and construction agent will usually be the Army Corps of Engineers or the Naval Facilities Engineering Command. The agent is responsible for acquiring the design and construction of Air Force MILCON projects. Normally, the design agent and construction agent are the same organization. The agent receives instruction and funding from the AFRCE. The agent must provide a finished project which meets Air Force technical and aesthetic requirements as well as meeting all of the user mission needs and functional requirements. In order to accomplish their charter, the agent provides design, procurement, construction management, engineering, and cost management services for each project. The technical aspects of each of these areas belong to the agent; however, as technical decisions impact mission or aesthetic requirements, the Air Force must be aware of these decisions in order to help guide the agent to decisions which meet technical, mission, aesthetic, and customer requirements.

Director of Engineering and Services (HQ USAF/LEE)

HQ USAF/LEE provides Air Force policies, instructions, and authority for the execution of design and construction of Air Force MILCON projects. Air Staff has the final responsibility to develop, program, defend, and execute the Air Force portion of the MILCON. At this level, MAJCOM MILCON submittals are reviewed, evaluated, and combined to form the Air Force MILCON submittal to the Office of the Secretary of Defense. While much of the responsibility for programming, design, and construction has been delegated to the AFRCEs and MAJCOMs, Air Staff maintains control over funds and approval of project scope changes exceeding plus 10 percent or minus 25 percent. The principle area which HQ USAF/LEE maintains an active interest in (does not delegate) is defending all facets of the MILCON to the Secretary of the Air Force, DOD, and Congress. For this reason, as well as good management and economy, projects must be completed within programmed costs, on schedule, and with minimum modifications. Modifications, or changes to a MILCON project, extract a high cost in time and money from scarce DOD resources.

Secretary of the Air Force

The Secretary of the Air Force provides support and guidance for the Air Force construction program.

Secretary of Defense

The Office of the Secretary of Defense provides broad criteria and policy guidance for military construction. All of the services' MILCON projects are combined at this level to form the DOD MILCON submittal to the Congress. This often requires project cutting in order to meet budget goals and may be one of the biggest hurdles a MILCON project must cross.

Congress

Congress provides oversight, program approval, and funding for the MILCON. Congressional staffers scrutinize MILCON projects to the smallest detail. Any inconsistencies, vague details, omissions, or mistakes in the project documentation will result in deferral of the project to a later fiscal year. Also, political influences may affect MILCON projects at this level.

III

**REQUIREMENTS
DEVELOPMENT**

III. Requirements Development

PARTIES INVOLVED: User, BCE.

Requirements development begins with the recognition of a facility or construction need. This recognition must then be transformed into a documented facility requirement.

You, the facility user, are the one who first recognizes the need for a new or altered facility. An example of this would be when an organizational commander is notified of new mission requirements. One of the first things that he or she will realize is that new facilities may be required to meet the new mission requirements.

Often, the using agency is not yet assigned to the base where the new facility is to be built. In this case, a Project Management Office or Site Acquisition Task Force is formed to represent the interests of the using agency during the MILCON process.

The first step for the using agency is development of their valid facility needs. A three step procedure is useful in determining facility requirements.

1. Determine the organizational missions and goals.
2. Determine what facilities are required to meet those missions and goals.
3. Determine if the current facilities are capable, in any way, of meeting the organization's facility requirements.

AFM 86-2, Standard Facility Requirements, identifies the authorized size of Air Force facilities. This manual contains approved criteria for the type, number, and size of facilities the Air Force can use, occupy, or build to support their missions. AFM 86-2 also describes the facility requirements system and gives detailed guidance on developing facility requirements. It must be noted that AFM 86-2 provides guidance only! The fact that a facility is listed in this manual does not provide automatic justification for the facility. Space requirements approved for a facility may fall under or exceed those listed in the manual depending on true Air Force needs.

If it is felt that new facilities are required, document these facility requirements on AF Form 332, BCE Work Request (see Appendix E). AF Form 332 must be used to request any work from the BCE. This form "starts the ball rolling" for a MILCON project. At least 3-5 years is required to complete a MILCON project. However, each installation usually has other valid MILCON projects in the queue ahead of your project and your project may be placed at the end of this queue. In this case, 8-10 years may be a more reasonable estimate of the time required to acquire a new facility.

Each organizational commander must review and sign all AF Forms 332 requesting new facilities. The organizational commander's signature indicates that the construction of the new facility is:

1. mission essential,
2. not prohibited by any directives that the requester is aware of,
3. not duplicated by other means.

The expenditure of severely limited resources on other than mission essential facilities cannot be justified in today's climate of austere funding and Congressional scrutiny of the DOD budget.

When completing AF Form 332, BCE Work Request, use layman's terms to give a clear, concise description of the work to be accomplished. Give complete and accurate justification. Instructions are on the reverse of the form. Attach sketches and any other information that helps clarify the facility requirement.

Work requests must be coordinated through many base agencies which have an interest in the proposed work. For example, the fire department must ensure that all base facilities have the proper fire suppression and protection equipment installed. The communication squadron needs a long lead time on new facilities in order to program for telephones, computers, and any specialized communication requirements. The BCE Customer Service Unit (CSU) can inform you of the coordination requirements for MILCON projects. Hand carrying of the work request through these agencies will significantly decrease the time required for action on the request while also reducing the chance of a lost work request. The key to a successful MILCON project is intense user involvement from the beginning.

After the work request has been completed, signed, and coordinated through the appropriate agencies, it should be submitted to the BCE CSU. CSU personnel will immediately assign a work request number to the work request. You must be sure to obtain this work request number at the time you submit the work request. This work request number is the sole method of tracking your work request through additional coordinating offices (if required) and through the many different offices of the BCE. Use this work request number when referring to the project or to inquire to the CSU about the status of your work request.

IV
VALIDATION

IV. Validation

PARTIES INVOLVED: User, BCE.

The validation phase of the MILCON process begins with the submittal of the AF Form 332, BCE Work Request to the CSU. After submittal of your work request to the CSU, a work request number will immediately be assigned to the work request. You must be sure to obtain this work request number at the time you submit the work request. This work request number is the sole method of tracking your work request through additional coordinating offices (if required) and through the many different offices of the BCE. Use this work request number when referring to the project or to inquire to the CSU about the status of your work request.

If/After all required coordination has been completed, the work request will be sent through the BCE Engineering and Environmental Planning Branch (DEE) office to the BCE Environmental and Contract Planning section (DEEV). Here, work will begin on validating your facility requirement.

Each type of facility on an Air Force base has a specific category code. The category code is a six digit code that denotes a specific type of Air Force facility. AFM 86-2 lists most Air Force category codes, while AFM 300-4, Volume III, provides an exhaustive list of all Air Force category codes. For the category code of the type of facility requested, BCE contract planners (DEEV) will compare the total facility requirement with the existing adequate base facilities. Total facility requirements are derived from AFM 86-2, Standard Facility Requirements. Next, the amount of existing adequate space is determined by the BCE contract programmers. Existing adequate space is defined as the amount of facility space under a specific category code that has a real property condition code of 1, which indicates that the space is in an adequate useable facility. All real property condition codes are defined in Appendix D. The amount of existing adequate space is then subtracted from the total requirement and the result is identified as the deficiency for that specific category code, or type of facility. The deficiency is the authorized size for the new facility. Note that AFM 86-2 provides guidance only! The fact that a facility is listed in this manual does not provide automatic justification for the facility. Space requirements approved for a facility may be less or more than those derived from AFM 86-2. The final size of a facility is based on the true needs of the Air Force.

The next step in this phase is presentation of the work request to the base Facilities Board (FB). MILCON projects receive validation, approval, and priority from the FB. All MILCON projects must be approved by the FB. The purpose of the FB is to assist civil engineering in establishing, determining the priority of, and meeting customer needs. The FB provides corporate review concerning the use of real property facilities and civil engineering resources. The FB operates at the base and MAJCOM level and is held monthly, bi-monthly, or quarterly, depending on the base and MAJCOM.

The FB is the corporate "decision-making" body on each base with regard to facilities. The FB is made up of the base or MAJCOM organizational commanders, the senior leadership. FB decisions are made with input from all organiza-

tions. Every organization contributes to FB decisions. FB decisions are not Civil Engineering decisions. The FB is charged with making facility decisions that are in the best interests of the base and the Air Force. Often, the FB has a Facilities Working Committee that meets prior to the FB. The purpose of the Facilities Working Committee is to develop recommendations for the FB and to provide an opportunity to resolve conflicts before the FB meeting. The Facilities Working Committee reviews MILCON work requests and makes recommendations to the FB. Your work request will be presented to the Facilities Working Committee first, and then to the FB. If there is no Facilities Working Committee at your installation, then your work request will be presented directly to the FB. The members of these boards are the organizational commanders on the base. The only difference between the Facilities Working Committee and the FB is the Facilities Working Committee is chaired by the BCE and the FB is chaired by the Base Commander. Typically, the FB works on a by exception basis. That is, the FB usually accepts the recommendations of the Facilities Working Committee unless someone objects to a recommendation made by the working committee.

User responsibilities to each of these boards is the same: Be prepared to brief and defend your project at these meetings! You should be prepared to brief the following aspects of your work request:

1. Total facility requirement for your mission.
2. The amount and condition of the existing facilities assigned for your mission - 35mm slides are recommended to depict substandard facilities and conditions.
3. The current situation, or how your organization is coping with the lack of existing facilities. What extra actions must you undertake in order to accomplish your mission with a lack of adequate facilities.
4. The impact on your mission if new facilities are not provided. How will your mission be affected if the project is not approved.
5. Any additional factors relevant to your work request.

This phase is critical to your project, it is the first major hurdle your project must pass. Lack of preparation for these briefings may result in your project being disapproved. Make an appointment with the contract programmers (DEEV) prior to the meetings and make sure they know of your intent to brief and defend your project to the Facilities Working Committee or FB. You know the most about your mission and facilities and you are the best prepared to brief the board. Also, while in contact with the contract programmers, find out what they have determined about your work request and what they plan to recommend to the board or committee about your project. Once again, intense user involvement, from the beginning, is the key to a successful MILCON project.

You should also brief your project to your organization's FB representative. The FB representative has inside knowledge of the typical functioning of the FB. He or she sees many work requests approved and disapproved by the FB each month. Your work request will carry more weight if your FB representative makes the case for your work request. Your FB representative knows the other members

of the FB and knows what it takes to persuade those members that your work request is needed by the Air Force. Since the Wing CC is the chairman of the FB, it would be best if you could sell your work request to him or her. A briefing or on-site tour is an excellent way to "sell your project."

If your work request is approved by the Facilities Working Committee and/or the base FB, your work request will formally become a MILCON project and the contract programmers will assign a project number to the project. This project number now replaces the work request number as the method of tracking the project. Be sure to obtain this project number from the contract programmers so you can track the project.

After approval of the project and assignment of a project number, the project will not receive priority attention until the base DEEV section receives the annual call for MILCON projects. This call comes from the MAJCOM and usually allows approximately two months to complete and submit the extensive documentation that is required for each MILCON project. Make another visit to the contract programming section (DEEV). Get the project number for your project. Give the contract programmers the name and phone number of the using agency's action officer for the project. Ask the contract programmers to call the using agency action officer when work is begun on the MILCON project documentation.

The annual MILCON call from the MAJCOM usually arrives at the base in early November. During the next two months, your project will receive priority attention as the project moves into the next phase of the MILCON process, programming.

V
PROGRAMMING

V. Programming

PARTIES INVOLVED: User, BCE, MAJCOM.

After a work request has been validated and approved by the FB, the BCE initiates the programming phase of the MILCON process with the preparation of DD Forms 1391 and 1391c, Military Construction Project Data (see Appendix F). These documents explain and justify your facility requirement to higher authorities. Extensive documentation is required to complete these forms and the numerous accompanying documents that are required for the annual base MILCON submittal to the MAJCOM. The base MILCON submittal includes all MILCON projects identified for accomplishment in the next five years. These documents contain basic information about the MILCON project including the project scope, cost estimate, facility requirements, current situation, and impact if the facility is not provided. This information constitutes the justification for the project.

The importance of this phase cannot be overemphasized! This documentation will be the basis for approval or disapproval by all higher authorities (MAJCOM, HQ USAF, OSD, Congress). Any inconsistencies, vague details, omissions, or mistakes in this documentation will result in the delay of your project to a later fiscal year.

There are many specific details that must be provided by the user for inclusion in the DD Forms 1391 and 1391c (collectively known as programming documents). You must work closely with the contract programmers to ensure that clear, concise, and accurate programming documents are produced and sent to the MAJCOM. The justification for all MILCON projects must be clear, concise, factual, and written in layman's language.

The contract programmers have complete guidance on the preparation of the programming documents. The DEEV section is the OPR for the preparation of these documents. However, your assistance is required to produce a believable set of documents that accurately convey your present situation and the reasons why you need a new facility. With your new facility at stake, you must take a very active role in the preparation of these documents. Make sure the using agency's project officer is involved.

The audience for these programming documents is Congress, Congressional staffers, and OSD analysts. This audience will closely scrutinize the programming documents. Any inconsistencies, vague details, omissions, or mistakes will be interpreted by high level authorities to mean that you, the user, are not sure what type of facility that you actually need. Approval authorities will then question your facility need which will result in the delay of your project to a later fiscal year. Analysts will actively search the programming documents for any reason to defer the project to a later fiscal year.

The goal of these programming documents is to sell your project to all higher level authorities. Remember that approval authorities are typically not engineers and are probably not familiar with your mission. These documents should not use building numbers, acronyms, Air Force jargon, highly technical terms, abbreviations, or references to Air Force publications.

Dollars or manpower to be saved and benefits to be gained should be identified in the DD Form 1391. Projects that correct any safety or health hazard should be identified as "Hazard Removal" in the ADDITIONAL block in the DD Form 1391. Be prepared to back up any claims made with hard data. Vague statements such as "considerable savings" or "increased morale" will not sell your project!

Avoid dry statements of simple fact and try to incorporate some journalistic creativeness into these documents in order to catch the readers attention. With so many MILCON projects submitted each year, it is very easy for your project to fade into the background.

Once again, it cannot be overemphasized that intense user involvement, especially at the beginning, is the key to a successful MILCON project. A successful project is one that meets the user's needs. In today's period of fiscal austerity, intense user involvement in the early stages of the project (requirements development, validation, and programming phases) is the key to simply getting the funds for the project. You can be sure that many facilities needed by the Air Force will never be funded. Figure 1 depicts the amount of user involvement required through the life of a successful MILCON project. This figure indicates that user involvement should be extremely high during the initial phases of the MILCON process: requirements development, validation, programming, and initial portion of the design phase. User involvement then decreases in the later portion of the design phase and the construction phase.

In other words, you, the facility user, tell the civil engineers what you want in your facility, then the civil engineers get your facility built. If you don't do a good job in telling the civil engineers what characteristics you need in your new facility, then your new facility probably won't meet your mission needs.

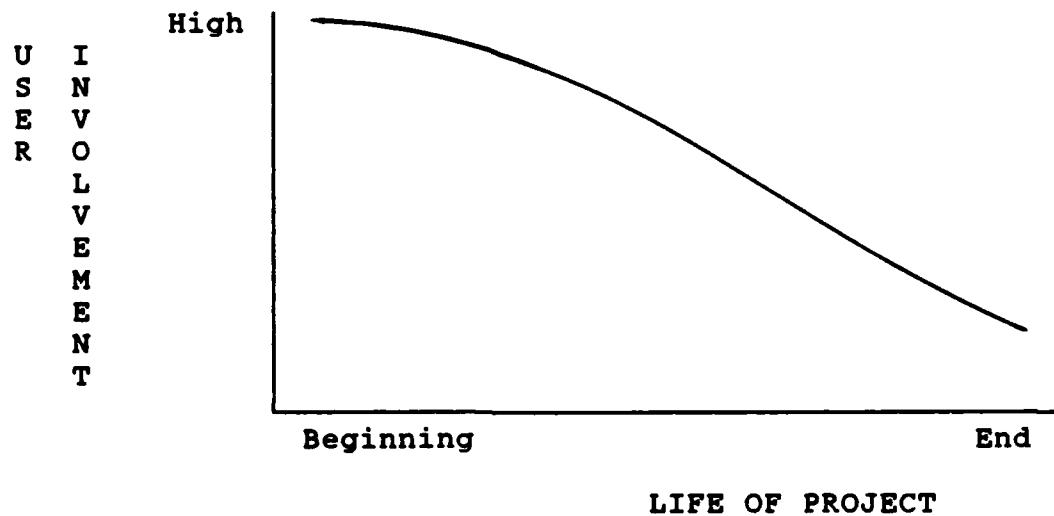


Figure 1 -User Involvement through the Life of a MILCON Project

Figure 1 shows that user involvement must be high during the initial stages of the MILCON project. The user must be heavily involved in the MILCON project, from the beginning through the design phase, in order to ensure that the facility to be designed and constructed is a facility that meets the user's need and the Air Force facility requirement. It is the responsibility of the user to make sure that the facility to be designed is the facility that he or she wants constructed. The user meets this responsibility through heavy involvement in the programming phase and initial portion of the design phase.

Another important activity is taking place during the preparation of the DD Form 1391 packages. This activity is the development of the base priority list. The base priority list is a prioritized list of all the MILCON projects for your particular installation. This list includes a recommended FY for each project. For instance, the first four projects in the list may be identified for FY 93, the second four projects for FY 94, and so on. The base priority listing covers five FYs.

This priority listing must be reviewed and approved by the FB. The approved priority listing will be on the cover of the base MILCON submittal to the MAJCOM. This priority listing is used by the MAJCOM for integration of all of the base submittals into a MAJCOM MILCON submittal to HQ USAF.

As you can see, where your project is placed in this base priority listing can have a large effect on when or if your project is finally approved and funded for construction. If your project is placed low in the base priority listing, it will probably be placed low in the MAJCOM priority listing, and low in all other priority listings. This will have the effect of putting your project on hold.

The using agency's commander is usually required to sign the DD Form 1391 to certify the accuracy of the documentation. The user should obtain a copy of the DD Form 1391 package for many reasons. First, for your files and for future reference. Second, and most importantly, you should forward a copy of the DD Form 1391 package for your MILCON project to your MAJCOM counterpart. Support of your MAJCOM counterpart will greatly enhance your projects chances of approval. Without the strong support of your MAJCOM counterpart, your project stands little chance of being accomplished. Therefore, you must ensure that your MAJCOM counterpart is very familiar with your project, the justification for your project, and the urgency of your project. Your MAJCOM counterpart should advise the MAJCOM civil engineering programmers (DEP) of the priority and need of your project. If your MAJCOM counterpart does not express the need of your MILCON project to the MAJCOM DEP office, the MAJCOM civil engineers may not fully understand the need and justification for your project.

The MAJCOM civil engineers are working with many bases and many MILCON projects. Support of your MAJCOM counterpart will help the MAJCOM civil engineers understand why the MAJCOM needs your project in addition to why your base needs the project. Your project is competing against many other MILCON projects for very scarce resources. MILCON funding in FY 88 was 7 percent of the amount of funding for weapon system procurement. Acquisition of your new facility will take a dedicated effort by all parties involved in the MILCON process. Intense user involvement in the MILCON process cannot be overemphasized.

After the MAJCOMs receive the DD Form 1391 packages from their bases, the civil engineers review the documents. Next, a MAJCOM FB is held to review and prioritize all of the MILCON projects submitted to the MAJCOM. The MAJCOM FB provides corporate review concerning Air Force facilities throughout the MAJCOM. Membership on the MAJCOM FB include the DCS or chief of each major staff function or operating agency. Your MAJCOM counterpart should attend this meeting and be prepared to brief the board on the following aspects of your project:

1. Your facility requirement, or what type of facility you need and why you need it.
2. The justification for your new facility.
3. The current situation, or how you are currently meeting your mission requirements despite the lack of adequate facilities.
4. Savings that will result from the accomplishment of your project. Savings may be manpower, equipment, fuel, or other resources. Savings must be verifiable as they will be fully investigated in an economic analysis.

This MAJCOM FB is another critical step in the MILCON process. As previously stated, this board prioritizes all the MAJCOMs MILCON projects and the result is a MAJCOM priority list. The MAJCOM priority list is similar in makeup to the base priority listing. It consists of a prioritized list of MILCON projects with each project identified for one of the next five FYs under consideration.

The MAJCOM priority list carries much more weight than the base priority list. The base priority list was simply a recommendation of MILCON priorities to the MAJCOM. The placement of a project high in the MAJCOM priority list (i.e., the first or second FY under consideration) signals that a particular project has very good chances of reaching final approval and funding.

You should actively "sell" your MILCON project to all interested and important parties. When your installation is visited by any MAJCOM personnel, arrange a briefing or on-site tour so that everyone knows that your organization is in need of a new facility. Invite your MAJCOM counterpart to your installation so that they can see and understand your facility need. Then, your MAJCOM counterpart can better represent your facility needs to the MAJCOM FB. During Inspector General visits, show the good, but also show the bad conditions that justify your facility need. Ultimately, the right people will understand your facility need, and this will help speed your project along toward becoming a reality.

Next, the MAJCOM submits its priority list and DD Form 1391 packages for each project to HQ USAF/LEE. HQ USAF/LEE reviews and prioritizes the projects submitted by the MAJCOMs and then the presents the projects to Air Force Facilities Panel.

The Air Force Facilities Panel can be thought of as a facilities board at the Air Staff level. The Facilities Panel provides corporate review and decision

making concerning entire Air Force MILCON. Their goal is to achieve the greatest benefit possible for the Air Force from the tax dollars spent on the MILCON. Each MAJCOM briefs the Facilities Panel on each and every MILCON project submitted. Once a MILCON project is approved by the Facilities Panel, HQ USAF/LEEC will issue a Design Instruction (DI) to the AFRCE. This DI will authorize the AFRCE to proceed with design of the project to 35% design complete. The programming and design phases overlap in this area. Design will proceed to 35% design complete and then design will be placed on hold until the project is authorized by Congress. Design is initiated on a MILCON project before Congressional authorization because it is the desire of Congress to have the design of projects substantially underway prior to the request for authorization and appropriation.

After a project is approved by the Air Force Facilities Panel, there are still many levels of review and approval that must be accomplished before the project is considered by the Congress. After the Facilities Panel, the MILCON must be approved by the Air Force Program Review Committee. The Program Review Committee reviews and approves the entire Air Force budget.

Next, the Air Force submits its proposed budget, which includes the MILCON, to the Office of the Secretary of Defense. Often, MILCON budget goals at this level necessitate a reduction in the MILCON. Budget analysts will scrutinize every detail of the project to make sure that the project is valid and is truly needed by the Air Force. Any projects with vague details, inconsistencies, omissions, or mistakes in the documentation will be the first projects cut in order to meet budget goals. Make sure that the documentation for your project is complete and accurate.

OSD incorporates the MILCON into the DOD budget which forms a part of the President's Budget Submission to Congress. The President's Budget is submitted to Congress in early January. This gives Congress many months to scrutinize the MILCON budget with a microscope. Congressional staffers will explore and propose other ways of meeting mission needs that do not require the construction of new facilities. Be prepared to respond quickly to inquiries about your project from high level reviewers.

Two Congressional actions are required to realize your goal of a new facility: MILCON authorization and appropriation. Each one of these items require a specific bill to be passed by the entire Congress. Finally, the bills must be signed into law by the President. The MILCON appropriation bill provides the actual funds required for the construction of the facility. However, before funds can be appropriated for your project, they must be authorized by Congress in the MILCON authorization bill. The MILCON authorization bill sets a maximum amount on the funds that can be appropriated for your MILCON project. The MILCON appropriation bill provides the actual funding for your MILCON project. The amount appropriated cannot be higher than the amount authorized. Congressional appropriation of funds for your project represents the end of the programming phase of the MILCON process.

An economic analysis (EA) is required for many MILCON projects. This document is also closely studied by high level authorities. The MAJCOM will task the base if an EA is required for your project. The base cost analysis section is the OPR for the development and completion of the EA. The EA examines all

alternatives to constructing a new facility. An example of an alternative to building a new facility is retrofitting an existing facility to house the required mission. Lack of an EA has been a reason OSD has used to cut MILCON projects out of submittals. Although an economic perspective is not always the most appropriate one, it is frequently used in periods of fiscal austerity.

In the EA, a cost-benefit analysis is performed on all the alternatives generated, including the alternative of constructing a new facility. This cost-benefit analysis consists, unsurprisingly, of two parts: a cost analysis and a benefit analysis. The cost analysis identifies and analyzes all of the costs associated with each alternative. The result of the cost analysis is an alternative list rank ordered in terms of cost, from the cheapest alternative to the most expensive alternative. The benefit analysis identifies and analyzes all of the benefits associated with each alternative. These two analyses are then combined into a cost-benefit analysis where the benefits provided by each alternative are weighed against the cost of each alternative. Finally, a judgement is made on which alternative will result in the most economical attainment of the desired benefits where the desired benefits are usually the acquisition of mission essential facilities.

A thorough, complete, and accurate EA will greatly enhance your project's chances of success. The user must be deeply involved in the development of the EA if the EA is going to help sell your project to high level approval authorities. EAs meet the same microscopic scrutiny that was described for programming documents above. Inconsistencies, vague details, omissions, or mistakes in EAs are another reason for quick deferral of MILCON projects to a later fiscal year.

VI
DESIGN

VI. Design

PARTIES INVOLVED: User, BCE, MAJCOM, AFRCE, Agent, HQ USAF/LEE

Design is a complex and multifaceted phase of the MILCON process. It actually overlaps with the programming phase as the design phase begins before the programming phase is completed. The design phase begins after your project is approved by the Air Force Facilities Panel. After this occurs, HQ USAF/LEEC issues a DI to the AFRCE. This DI authorizes the AFRCE to proceed with the design of the project to 35% design complete.

However, before the design can be initiated, the Project Book (PB) must be completed. The PB is a very critical document which requires intense user involvement. The PB contains data, criteria, functional requirements, and cost information to support the programming and design of MILCON projects. The PB is important because it is the framework and the basis for incorporating user needs and user criteria into the design process. The project book is the sole means of conveying the user's wants, desires, and needs to the facility designer. If a requirement is not in the PB, it won't be in the design and won't be in the completed facility.

The BCE is the OPR for preparation of the PB. At some bases, the contract programmers (DEEV) prepare the PB, while at other bases, the design engineers or architects (DEEE) prepare the project. No matter which office is the OPR for the PB, intense user involvement is required in the preparation of this document. The amount of user involvement in the PB development and other phases of the MILCON is very apparent to MAJCOM and Air Staff reviewers. Shallow user involvement inevitably results in project delay (until the user gets involved) or disapproval of the project.

MAJCOMs provide PB guidance to each of their bases. The typical PB consists of a cover sheet and 17 tabs, or Tab A through Tab P. Each tab addresses a specific part of the new facility. For example, Tab B addresses user requirements. MAJCOMs provide PB outlines to the bases under their command. This PB outline consists of many items with an INCLUDED and a NOT INCLUDED column. These columns are provided as a check-off of what is and is not included in the PB. This outline format is not intended to be used in the PB, but instead, the outline is to be used as a checklist for the items that are applicable to the project. Applicable items should then be fully described in narrative format in the PB. The exact format of the PB will vary slightly depending on the MAJCOM. An example of Tab B, User Requirements Summary, of the PB outline is shown in Appendix G.

Much of the PB guidance consists of checklists that civil engineering personnel and the using agency can go through, line by line, and determine if that item applies to the MILCON project. For each specific item determined applicable to your project, further explanation is required. This information will be used by the facility designers and will directly impact on the design and construction of your new facility.

The PB subphase of the MILCON process is the time when all general, specific, and unique user requirements must be identified. No single item should be taken for granted. The biggest problem with PBs is that they often do not reflect user requirements. It is the user's responsibility to ensure that the PB contains an accurate and complete description of the user requirements. If latrines are not identified in the PB, you may not get latrines in your completed facility!

After the PB is completed, it is forwarded to the MAJCOM for review. If the PB is approved by the MAJCOM, it is forwarded to the AFRCE. As previously noted, the AFRCE is a field extension of HQ USAF/LEE and manages the design and construction of Air Force MILCON projects. The AFRCE is also the funds manager for MILCON projects. The primary function and goal of the AFRCE is to ensure quality design and construction that is on time and within the budget. The second goal of the AFRCE is customer satisfaction. You, the user, are the customer. The AFRCE will do everything it can to please you as long as your wishes, needs, and requirements do not conflict with the primary goal identified above.

HQ USAF/LEEC issues design instructions to the AFRCE. This amounts to a calculated gamble by the Air Staff. The Air Staff tries to predict which projects will be authorized and appropriated funds by Congress. At this point, the AFRCE instructs the design agent to proceed to 35% design complete. The PB, along with AFM 88-15, Criteria and Standards for Air Force Construction, form the primary guidance for the design of the new facility. The design agent is normally the Army Corps of Engineers or the Naval Facilities Engineering Command, depending on your particular installation. The design agent may accomplish the design inhouse by its own design engineers or it may contract with an architectural-engineering firm to complete the design, based on the type of design required and the current load of the design agent.

The design of the facility is an iterative process that is accomplished in stages. The first stage is 35% design complete. The design agent forwards the 35% design submittal to the BCE, the MAJCOM, and the AFRCE. The 35% design submittal includes the basic building blocks of the facility such as the floor layout plan and elevation plans. The BCE forwards the submittal to all base agencies that need to review the submittal, including the user. This submittal is then reviewed by all parties. The Air Force's chief responsibility is functional review, or ensuring that the facility designed will meet Air Force mission requirements. For example, checking for good office arrangement is an example of functional review as is checking hangar door height to ensure that the aircraft intended for the hangar will fit in the hangar. Functional review is making sure your facility will meet your needs.

This functional review is accomplished by making and documenting comments about the design and noting any possible problems with the design. Any item in the design that will not meet the needs of the user should be noted. The user should direct any questions on the design to the BCE. The BCE will act as a user consultant and help the user understand the drawings and specifications which make up the design. The user should not, in general, be concerned with technical review of the design submittal. Technical review is the responsibility of the design agent. However, the user should be concerned with the technical decisions that may affect mission requirements. All user comments on the design

should be submitted to the BCE. The BCE will forward these design comments to the AFRCE through the MAJCOM. The MAJCOM and AFRCE review all of the comments made.

Next, there is a meeting to review all of the 35% design review comments. All Air Force players attend this meeting (User, BCE, MAJCOM, and AFRCE). The purpose of this meeting is to determine the validity of the 35% review comments. Every comment will be addressed and answered. The AFRCE will make a final determination as to whether or not action will be taken on each comment. The user must be present to brief the AFRCE on the user's 35% design review comments and the need to incorporate the comments into the design.

Now, the design is usually placed on hold. No further design will take place until the project is authorized by Congress. Congressional authorization of a MILCON project is based on the 35% design. This Congressional authorization approves the scope of the project (usually the total square feet of the facility) and the total dollar cost of the facility. Congress will only consider MILCON projects that are at least 35% design complete.

If/After your project is authorized by Congress, the AFRCE will instruct the design agent on how to proceed with the design. This guidance includes any modifications that need to be made to the 35% design submittal, based on the 35% design review comments and the 35% design review meeting described above.

The design agent is responsible for technical review of the design. Technical review consists of ensuring that the design is in accordance with federal, state, local, DOD, and Air Force design criteria. Examples of technical review include making sure that the air conditioning system can properly and adequately cool the facility and that the facility includes provisions for the disposal of hazardous waste generated at the facility, if any.

The next major submittal is the 60% design submittal. The functional review process outlined above is repeated. Each submittal should be intensely reviewed by the user to make absolutely sure that what is being designed is what you want. If an item is overlooked in the 35% review, it is too late to change it in the 60% review due to the fact that the Congressional authorization for the project was based on the 35% design. Therefore, the 35% design (after comments and review meeting) is firm and can not be easily changed. The 35% design submittal reflects the basic building blocks of the facility. The 60% design submittal assumes that the 35% design submittal is now firm, and the additional design is based on this firm 35% design. To change an item from the 35% design during the 60% design review would be similar to starting the design over. The Air Force does not have funds available to cover such mistakes, and therefore, the design will continue based on the original 35% design.

The final design submittal is the 95% submittal. This submittal is essentially a completed facility. The Air Force once again conducts a functional review. All comments are returned to the AFRCE through BCE and the MAJCOM. If any modifications to the design need to be made, the AFRCE will issue final instructions to the design agent. After the design agent makes the final modifications to the design and submits the final design to the Air Force, design is 100% complete.

VII
CONSTRUCTION

VII. Construction

PARTIES INVOLVED: User, BCE, MAJCOM, AFRCE, Agent, HQ USAF/LEE

Construction is the final phase of the MILCON process. This phase usually takes from one to two and one half years, depending on the facility to be constructed. If everyone has done his or her job up to this point and things have gone smoothly, the user can sit back and relax while his or her facility is being constructed. This is the reward for a job well done. If the design is not what the user wants, then the user will probably remain dissatisfied, because the user has a very small role in the construction phase of the MILCON process.

This phase begins with the completion of the design for the new facility. Next, the design agent turns the project over to the construction agent, which is usually a different office within the same organization (Army Corps of Engineers or Naval Facilities Engineering Command). The construction agent is responsible for contracting with a construction firm to have the facility built. Getting a contract for a MILCON project can take anywhere from six months to one year, depending on the type of facility to be built and the workload of the construction agent. The Air Force has a very small role in the contracting of MILCON projects.

The user is usually invited to the prebid and preconstruction conferences. This keeps the user informed of the project progress and allows the user to voice any special construction concerns prior to the commencement of construction. An example of a user construction concern would be construction of a hangar in a secure flight line area. In this case, construction personnel would require special permits to access the flight line. Also, user attendance at this meeting may help clear up any misconceptions or misunderstandings concerning the oncoming construction. At the preconstruction conference, the user is responsible for identifying any operational or security requirements that might impact construction of the new facility.

Note that the construction agent is responsible for all aspects of the construction contract. Air Force contracting has no involvement in this process whatsoever. The AFRCE monitors the construction agent to make sure Air Force policies and goals are met and the AFRCE also releases funds to the construction agent as the project progresses.

After a contract is awarded for the construction of a facility, construction should begin within one to six months, depending on the location, time of year, and specific nature of the contract. Construction typically begins in the spring or summer.

The user will not be involved in the process until the facility is almost finished unless the user wants to change something in the facility. However, to comply with Congressional guidance, maximize cost effectiveness, and achieve on time, within budget construction, changes to the construction contract are held to an absolute minimum. As already mentioned, user changes are rarely allowed during the construction phase of the MILCON process. Before even considering a user requested change during the construction phase, refer back to the user's responsibility to identify all facility requirements in the PB. Remember

that if it is not in the PB, it is not going to be in the construction project. However, if the user does want to try to change the project during construction, there are certain steps that he or she should take. This process is identified next, although user requested changes during construction will almost always be denied.

1. Submit the project change request in writing to the BCE. Describe the requested change as completely as possible. State the justification for the change and the reasons why this work was not identified in the programming and design phase of the MILCON process. Your request must demonstrate that the capability of the facility will be adversely affected without the change.

2. If the BCE concurs with your request, the request will be forwarded to the MAJCOM DCS/Engineering and Services. If the BCE does not concur with your request, your request is denied. There are no other alternative request channels.

3. If the BCE and MAJCOM DCS/Engineering and Services concur with your request, the request will be forwarded to the AFRCE.

4. The AFRCE has final authority over the approval or disapproval of your request, except that extremely costly changes must be approved by HQ USAF/LEE and must be reported to Congress. The AFRCE will only consider change requests that have come through the proper channels, that is, requests that have been approved by the BCE and MAJCOM DCS/Engineering and Services. Remember that the primary function of the AFRCE is quality construction on time and within the budget. Construction changes cost time and money, and in the construction business, time is money. A change request during the construction phase is clearly in opposition to the primary function of the AFRCE. Therefore, if your change request does make it to the AFRCE, it still has a very small chance of being approved.

If the using agency experiences a verifiable mission change during the construction phase that necessitates a change in the facility, the procedure outlined above should be used. The only valid reason for user requested changes during construction is new mission requirements.

The construction agent is responsible for ensuring that the construction contractor fulfills the terms of the contract. The construction agent will normally inspect the construction area every working day to make sure that the contractor is complying with the contract.

The BCE contract management office (DEEC) performs contract surveillance on the project throughout the construction phase. Construction surveillance consists of weekly site visits and weekly contact with the construction agent in order to monitor the progress of the construction. Also, should any problems arise, DEEC will represent and transmit Air Force interests to the construction agent.

Construction surveillance also consists of ensuring that quality assurance is provided by the construction agent. Quality assurance is making sure that the construction agent is ensuring that the contractor is fulfilling the terms of the contract.

Periodically, BCE contract management personnel should invite the user to on site visits of the construction area to ensure that the construction is satisfying user needs. During these site visits, the user should survey the construction area and identify any potential problems.

As the facility nears completion, the user should visit the new facility with increasing frequency. Air Force facility acceptance procedures require a preliminary, prefinal, and final inspection of the new facility. The user must take several actions prior to the preliminary inspection of the facility:

1. Visit the facility often enough to become familiar with it.
2. Tour the new facility and identify all items in the facility that are not complete.
3. Identify any items in the facility that do not appear to be constructed correctly.
4. Inform BCE contract management personnel, before the preliminary inspection, of any deficiencies found.
5. Be prepared to identify, at the preliminary inspection, all of the deficiencies you have noted. Also, and importantly, be prepared to explain why each deficiency needs to be corrected (i.e., how will this deficiency adversely impact your mission). If a deficiency is not important, it might not be corrected.

The preliminary inspection is held by the construction agent. The user must attend this inspection. BCE personnel will inform the user of the time and date of this inspection. This inspection is made when the facility is substantially complete and allows both the Air Force and the construction agent time to discuss and settle construction questions without the contractor's presence. The purpose of this preliminary inspection is to identify deficiencies, establish standards of quality for facility acceptance, and mutually agree on a beneficial occupancy date, which is the date when the Air Force accepts and takes over the facility.

The prefinal inspection is a detailed and thorough inspection by the construction agent and the contractor to identify any construction deficiencies and remaining contractual items (such as system operation manuals and training requirements). Deficiencies are documented on what is known as a punchlist. This inspection is made as soon as practical after the preliminary inspection. The construction agent will identify Air Force requirements to the contractor for resolution based on the comments presented at the preliminary inspection.

The final inspection is conducted by the construction agent. The user must attend this inspection. BCE personnel will notify the user of the time and date of this inspection. The BCE or designated representative will accept the facility for the Air Force on DD Form 1354, Transfer and Acceptance of Military Real Property. When the DD Form 1354 is signed, the base accepts all responsibility for the operation and maintenance of the facility except as noted on the back of the form. Before the inspection is scheduled, the AFRCE and construction agent

should agree on a timetable and method of correction for all known construction deficiencies identified on the punchlist.

As part of the terms of the contract, the Air Force usually receives training on the equipment installed in the facility. The user will need to attend the training sessions for certain equipment (such as hangar doors or other specialized equipment). BCE personnel will notify the user of the training sessions that he or she should attend. The Air Force also receives systems operation manuals for the equipment and systems installed in the facility. Manuals that the user needs will be provided to the user by BCE personnel.

Your new facility remains under warranty for a period of one year from the beneficial occupancy date. If any items break or do not work correctly, promptly notify the BCE contract management office (DEEC). DEEC will contact the construction agent who will have the contractor repair or replace any warranty items.

If any construction deficiencies are ever noted, even after the Air Force has accepted the facility, promptly notify the BCE contract management office. The contractor may be liable for the deficiency.

Remember that the BCE is your point of contact concerning all matters of the MILCON. Do not hesitate to call or ask the BCE any questions concerning the MILCON. The BCE's MILCON goal is customer satisfaction. The BCE will work with you to provide you with the best possible facility that meets your needs.

VIII

MILCON FLOWCHART

VIII. MILCON Flowchart

Figure 2 depicts the major activities and milestones that all MILCON projects must pass through. Certain activities shown in Figure 2 may overlap or be completed slightly out of sequence. Figure 2 is provided to give the user an understanding of the general (typical) sequence of events that must occur prior to the realization of a new facility. The time required to complete the activities shown in Figure 2 may be as little as 3-5 years. However, many MILCON projects take 8-10 years for completion.

Some of the events shown in Figure 2 are not discussed in the MILCON User's Guide. This is because the user does not participate in those particular events. For instance, all of the events from OSD review to Congressional action will occur on their own, and base level personnel will not participate in these events. However, the active and informed MILCON user should follow the progress of his or her project and be aware of the high level decisions being made concerning the project.

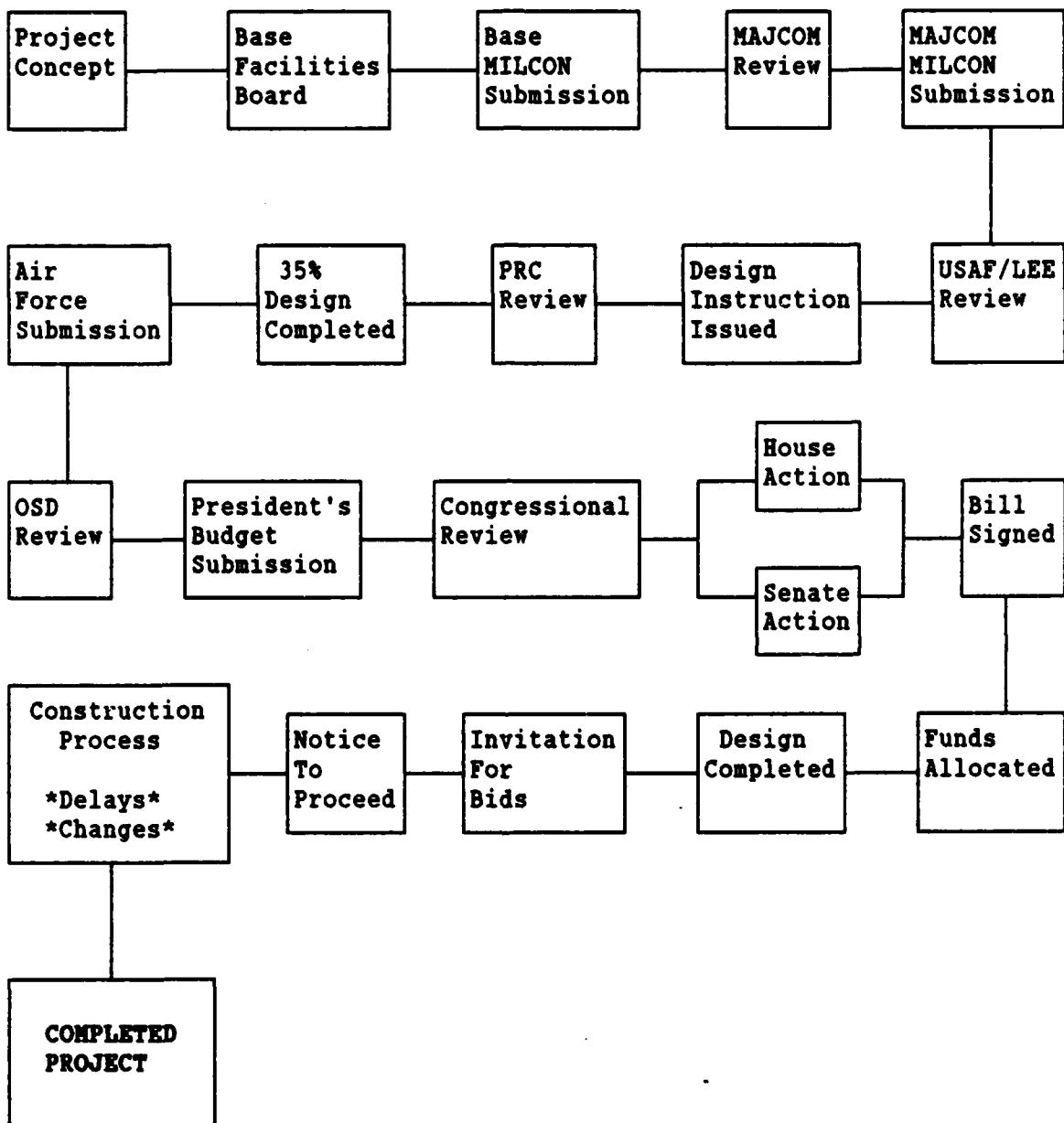


Figure 2 - MILCON Flowchart

Appendix A: HQ USAF/CV Letter, 29 Jan 88

**DEPARTMENT OF THE AIR FORCE
OFFICE OF THE CHIEF OF STAFF
UNITED STATES AIR FORCE
WASHINGTON, D. C. 20330-2000**

SUBJECT: Management of the Military Construction Program (Our Letter 29-ME-22)

TO: AMWCOM/CC

1. Congressional concern for Air Force design and construction execution of the Military Construction Program dictates a stronger approach to user involvement in the design process. The House Appropriations Committee directed the user must approve design prior to the start of construction to ensure the design meets the user agency's needs. The Committee also directed steps be taken to limit user changes after start of construction. These actions require reiteration of Air Force policy on user changes during design and construction and user involvement during design and construction.
 2. Air Force policy on user changes is only those changes absolutely necessary to meet the mission should be made after the concept stage (35 percent design). While the previous version of this policy reduced changes, there still are too many avoidable changes being made. Air Force policy on user involvement is users must participate early in programming, yet involved in the concept development, and ensure all user requirements are included in the final concept design (35 percent stage). The final concept design is the last chance for the user to input user requirements except for necessary mission changes as stated above. The user will approve the design before construction starts. A recent review indicates a trend toward user generated changes that should have been resolved during programming or early in design. These two policies should be given high priority to ensure users develop early and accurate project criteria and then ensure the users adhere to that criteria. Critical review of user changes after the final concept stage should also be emphasized. A change in commanders is not an acceptable criteria change to justify design changes when projects are beyond the concept design stage.
 3. A recent memorandum from the Deputy Assistant Secretary of Defense for Installations pointed out our execution rate has slipped the last two years. Failure to meet OSD execution goals has a direct impact on our ability to defend our requests for MILCON funds through the PUD cycles and on the Hill. I solicit your support in emphasizing early and direct user involvement, limiting user changes after the final concept stage, and achieving timely execution to ensure continued Congressional support of the Military Construction Program.

John L. Piotrowski
JOHN L. PIOTROWSKI
General, USAF
Vice Chief of Staff

Appendix B: Glossary of Terms

Air Force Regional Civil Engineer (AFRCE) - A field office of the Air Force Engineering and Services Directorate (HQ USAF/LEE) responsible for the management of design and construction of projects designated by HQ USAF/LEE.

Appropriation, Congressional - The House Appropriations and Senate Appropriations subcommittees on Military Construction provide a conference report which details the funds to be appropriated for projects. The House and Senate vote, and the projects and amounts approved are enacted in the annual Military Construction Appropriation Act. These amounts are referred to as the appropriated amount for each project.

Authorization, Congressional - The House Armed Services and Senate Armed Services Subcommittees on Military Construction validate the requirement and funds required for military construction projects and then provide a conference report. The House and Senate vote and the projects and amounts approved are enacted in the annual Military Construction Authorization Act. These amounts are referred to as the authorized amount for a project. Authorization is a prerequisite for appropriation.

Beneficial Acceptance - Air Force acceptance of a facility from the construction agent with complete ownership to the Air Force and custody of the facility to the user. The date the facility is accepted for occupancy by the user is called the Beneficial Occupancy Date (BOD). It does not have to be subsequent to the final inspection or after physical completion.

Category Code - A six digit codes which identifies the functional use of each existing and proposed Air Force facility.

Construction Agent - The Department of Defense component responsible for the technical execution of construction of a project. For Air Force Military Construction Projects, this is normally the Army Corps of Engineers or Naval Facilities Engineering Command.

Construction Contract Changes - These can be either mandatory, optional or user changes to a Military Construction Program construction contract proposed by the construction agent or the user. These changes must meet one of the following:

a: Mandatory Changes:

(1) Actual conditions found on the construction site are not compatible with the drawings and specifications.

(2) Unknown or unforeseen site conditions make changes necessary.

(3) Obvious technical errors or omissions in the drawings and specifications must be corrected to adequately define the work.

b: Optional changes. Changes in basic design criteria since design was completed, omissions in drawings or specifications, contractor proposals, and other improvements in design.

c: User changes. Revised operational mission or equipment requires a change in the facility.

Construction Surveillance - Owner representative oversight of and liaison with agents. Such surveillance by Air Force representatives will not supplant the responsibilities of the construction agent. Surveillance includes coordination between base agencies and the construction agent such as processing utility outages, road closures, and work clearance requests.

Design Agent - The Department of Defense component responsible for technical execution of project design. For Air Force Military Construction Projects, this is normally the Army Corps of Engineers or Naval Facilities Engineering Command.

Design Instruction (DI) - Any management action initiated through the Programming, Design, and Construction Information Management System (PDC) which affects a specific project. This will range from the initial action which starts a project to any change or comment which the program manager needs to forward to the field. The initial Air Staff design instruction designates data elements such as the PDC number, fiscal year, base, project title, requiring major command, host major command, program amount, scope, category code, design and construction manager, design and construction agent, and contain comments from the program manager.

Functional Review - A review to ensure the user requirements are included in the design. The user is guided through the design by project designers to allow the user to fully understand the drawings and specifications as they relate to their requirements.

Inspection - The construction agent's review of all phases of the construction work to ascertain quality or state of work and to determine compliance with plans and specifications and contract provisions. This includes, but is not limited to, such items as checking layout of the construction in the field and safety compliance; inspecting workmanship and materials to determine conformity with contract documents; reviewing laboratory tests and analysis of materials; completing and submitting field and progress reports; and checking monthly and final estimates as a basis for contractor payment.

Military Construction Program (MILCON or MCP) - The program approved annually by the Congress in the Military Construction Authorization Act and the Military Construction Appropriation Act.

Program Amount (PA) - Before Congressional approval, the program amount is equal to the amount of funds requested. After Congressional approval, the program amount is equal to the amount of funds appropriated for the project.

Project Book (PB) - A document which contains design data, criteria, major command policies, user functional requirements, and cost information for MILCON projects.

Real Property Condition Code - See Appendix D.

Scope - The approved major quantitative unit of measure of the primary facility of a project as presented to the Congress for project justification on the DD Form 1391, Military Construction Project Data. For the operations and maintenance program (O&M), unspecified minor construction (P-341), and nonappropriated

funds (NAF) projects, scope is the quantitative unit of measure as contained in the AF Form 1241.

Technical Review - A review to verify technical sufficiency of the design. Reviewers ensure functional adequacy, provision of special technical requirements, adherence to Air Force criteria, and identify and remove design deficiencies before contract awarded.

User - The lowest level commander exercising operational control over the function for which the project is programmed.

Appendix C: List of Acronyms

AFRCE – Air Force Regional Civil Engineer

BCE – Base Civil Engineer

CSU – Customer Service Unit of the BCE organization

DOD – Department of Defense

EA – Economic Analysis

FB – Facilities Board

F-Panel – Facilities Panel

FY – Fiscal Year

MAJCOM – Major Command

MCP – Military Construction Program

MILCON – Military Construction Program

OPR – Office of Primary Responsibility

OSD – Office of the Secretary of Defense

PB – Project Book

PRC – Program Review Committee

Appendix C: Real Property Condition Codes

Code Definition

- 1 **Usable--Class A (adequate).** Generally meets criteria. A facility which can be used to house the function for which currently designated through end-position use with reasonable maintenance and without major alteration or reconstruction. Its functional adequacy, physical condition, structural adequacy, location, and adequate utility systems, that is, heating, air conditioning, ventilation, power, are the major elements of the determination. The use of this code does not prohibit project work. However, any construction project will indicate either a change in use, conversion, or addition.
- 2 **Usable--Class B (substandard).** Upgrading required and practical. A facility which is structurally sound, and which is inherently capable of being raised to usable--Class A standards for housing function for which currently designated by reasonable and practical expenditure of funds; that is, alteration, soundproofing, relocation, strengthening, fire protection, deficiency correction, air conditioning, heating, or mechanical ventilation.
- 3 **Force use (substandard).** A facility that cannot practically be raised to meet usable--Class A standards for housing function for which currently designated, but which, because of necessity must be continued in use for a short duration, or until a suitable facility can be obtained. Its physical condition, location, lack of adequate utility systems, or other overriding factors are such that the facility cannot be justifiably or economically improved or upgraded for that function. This definition also applies to a leased facility where the lease was entered into as the only means by which the required space could be provided. This excludes leases which are advantageous to the Air Force for reasons of short duration of requirement, location, economics, and so forth, which will be code 1.
- 4 **Sterile--A facility which:** (a) does not meet the condition classification codes 1,2,3, or 5; (b) is excess to mission requirement in designed, changed, or converted use and is not, due to economic considerations, considered appropriate for disposal. The expenditure of maintenance funds on facilities in this classification is not authorized except for safety, health, or pickling the facility. This code will apply to all facilities as they are vacated when the entire installation becomes excess of requirements.
- 5 **Facilities committed to Congress:** Identifies all facilities that have been committed to Congress for disposal. This code will not be changed unless permanent retention is approved by HQ USAF.

6 Disposals approved by all levels of the Air Force. Identifies all facilities approved for disposal within the Air Force other than those in condition code 5.

If real property Condition Codes do not reflect the current condition of the facility, they can be changed by an Engineering Analysis AF Form 1442 and submitted in writing to the BCE Real Property Office (DEER) for the change to be made on the HAF-LEE(AR)7115 Report.

Appendix E: AF Form 332, BCE Work Request

(See Back Of This Set For Instructions)

BASE CIVIL ENGINEER WORK REQUEST				
1. From (Organization)	2. Office Symbol	3. Date of Request	4. Work Request Number (For BCE Use)	
5. Requester's Name and Phone Number		6. Required Completion Date	7. Building, Facility, or Street Address Where Work Is To Be Accomplished	
8. Description Of Desired Work (Include Sketch or Plan, etc, When Appropriate)				
<p>Answer Question - What does this project provide? Example - Construction of a new aircraft hangar</p>				
<p>9. Brief Justification For Desired Work (Not Required For Maintenance & Repair)</p> <p>Answer Question - Why does the Air Force require this project? In general, the fact that a facility is substandard is not a basis for justification.</p>				<p>10. Donated Resources</p> <p><input type="checkbox"/> Funds <input type="checkbox"/> Labor <input type="checkbox"/> Material <input type="checkbox"/> Contract by Requester <input type="checkbox"/> None</p>
11. Name, Grade, and Signature (See Instructions On Reverse)				
12. Coordination				
FOR BASE CIVIL ENGINEER USE				
13. METHOD OF ACCOMPLISHMENT				
<p>WORK ORDER</p> <p><input type="checkbox"/> IN-SERVICE <input type="checkbox"/> SELF-HELP <input type="checkbox"/> CONTRACT</p>	<p>JOB ORDER</p> <p><input type="checkbox"/> EMERGENCY <input type="checkbox"/> SELF-HELP <input type="checkbox"/> URGENT <input type="checkbox"/> M/C <input type="checkbox"/> ROUTINE</p>	<p>SELF-HELP</p> <p><input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> BRIEFING REQUIRED <input type="checkbox"/> INSPECTION REQUIRED <input type="checkbox"/> ADEQUATE COORDINATION</p>		
SECTION 14 TO BE COMPLETED ONLY IF WORK IS TO BE ACCOMPLISHED BY WORK ORDER				
14a. Work Class	14b. Priority	14c. Est. Hours	14d. Estimated Funded Cost	14e. Total Estimated Cost
<p>14f. <input type="checkbox"/> THERE IS NO NEED FOR AN ENVIRONMENTAL ASSESSMENT (AFR 19-2) <input type="checkbox"/> A WRITTEN ASSESSMENT IS BEING/MAS BEEN PROCESSED</p>				<p>14g. <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED</p>
15. Name, Grade, and Signature of Approving Authority				16. Date of Signature
17. Remarks				

Appendix F: DD Form 1391, Military Construction Project Data

AFR 86-1 Vol I 7 May 1984

1. COMPONENT	FY 19 MILITARY CONSTRUCTION PROJECT DATA			2. DATE
3. INSTALLATION AND LOCATION		4. PROJECT TITLE		
5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST (000)	
9. COST ESTIMATES				
ITEM	LINE	QUANTITY	UNIT COST	COST (000)
BE CLEAR AND CONCISE - EXPLAIN PRINCIPAL FEATURES OF WORK				
YOU ADD THIS LINE WHERE APPROPRIATE				
10. DESCRIPTION OF PROPOSED CONSTRUCTION INCLUDE AS APPROPRIATE FOR UNACCOMPANIED PERSONNEL HOUSING PROJECTS				
GRADE SIZE: 6-1-64. 64-64. 67-64			LAST ENTRY IN ITEM 10 - NO ENTRY IF AIR COND IS ZERO	
AIR CONDITIONING _____ TONS				
11. REQUIREMENT:	12. APPROXIMATE	13. SUBSTANDARD	14.	
TOTAL REQUIREMENT FOR THIS CATEGORY. CODE NEEDED TO MEET END POSITION MISSION		CONDITION CODE 1 ASSETS	CONDITION CODE 2 & 3 ASSETS	
UNITS OF MEASURE MUST BE CONSISTENT WITH COSTING FAC/ DEFICIENCY DETAIL DATA SHEET				
PROJECT: ANSWER QUESTION - WHAT DOES THIS PROJECT PROVIDE? EXAMPLE - CONSTRUCTION OF A NEW AIRCRAFT HANGER				
REQUIREMENT: ANSWER QUESTION - WHY DOES AF DESIRE THE PROJECT? IN GENERAL, THE FACT THAT IT IS SUBSTANDARD IS NOT BASIS OF REQUIREMENT.				
CURRENT SITUATION: TELL HOW IT IS BEING DONE NOW AND CONDITIONS. THIS SHOULD SUPPORT REQUIREMENT. LAST SENTENCE GIVE DESCRIPTION OF EXISTING FACILITIES, I.E. - DEMOLITION, ETC.				
IMPACT IF NOT PROVIDED: TELL TO WHAT EXTENT THE MISSION WOULD BE AFFECTED IF THE PROJECT WERE NOT APPROVED.				
ADDITIONAL: INCLUDE AN ECONOMIC ANALYSIS STATEMENT FOR EACH PROJECT. USE THIS SPACE TO STATE RATE ELIGIBILITY. THIS WILL BE PUT ON THE DD FORM 1392 FOLLOWING THE FRONT PAGE FORM 1391.				

DD Form 1391

PREVIOUS EDITIONS MAY BE USED INTERMITTENTLY
UNTIL EXHAUSTED

PAGE 00

Figure 4-11. Sample DD Form 1391—Explanation of Instructions for Completing the Form.

1. COMPONENT AIR FORCE	FY 19_____ MILITARY CONSTRUCTION PROJECT DATA		2. DATE
3. INSTALLATION AND LOCATION			
4. PROJECT TITLE ADD TO CLIMATIC TEST FACILITY		5. PROJECT NUMBER	
11. REQUIREMENT: <u> </u> SF Adequate <u> </u> SF Substandard <u> </u> SF			
<p>PROJECT: Answer the question: <u>What physical assets does this project provide?</u> (For example: "Construction of an <u>addition to the existing Climatic Test Facility</u>.)</p> <p>REQUIREMENT: Make positive statements that give a clear picture of why the facility is required. (For example: "A facility is required in which large aircraft components and weapon systems may be exposed to and tested in artificially produced extreme weather conditions. This facility must provide a means for testing engines to evaluate performance, durability, and operating parameters under extreme environmental conditions, including the evaluation of corrosive resistance characteristics and the exposure to wet and humid conditions (rain test).")</p> <p>CURRENT SITUATION: State clearly how the requirement is being met today. (For example: "This one-of-a-kind climatic test facility has been in operation for 24 years. The existing single engine test stand limits engine testing to one per test cycle with no provisions for simultaneous long-term exposure to low temperatures. Lack of this capability makes full and efficient use of available facilities most difficult.") Also state how the mission is affected. (For example: "Large aircraft components and weapon systems cannot fit in the existing all-weather room which necessitates using the main test chamber for rain test. This chamber was designed to accommodate large transports, bombers, or combinations of several smaller type aircraft. Plant efficiency is sacrificed when the relative smaller components and weapon systems are tested in this chamber.") However, if assets were to be disposed of, the last sentence should so state. (For example: "Two substandard facilities will be disposed of on completion of this project," or "Two substandard facilities in the way of construction will be disposed of as a result of this project.")</p> <p>IMPACT IF NOT PROVIDED: Answer the question: <u>What will be the effect on the mission if this project is not approved?</u> This is usually a one or two sentence "punch line" which reaffirms the fact that the "current situation" is unacceptable and must be changed.</p> <p>ADDITIONAL: Include additional justification if necessary. Also include NATO eligibility statement.</p>			

DD Form 1391c - PREVIOUS EDITION IS OBSOLETE IN THE USAF. PAGE ONE
GSA GEN. REG. NO. 1077-241-130/12-15

Figure 4-12. Sample DD Form 1391c, FY_____ Military Construction Project Data.

Appendix G: Tab B, User Requirements Summary, Project Book Outline

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USER REQUIREMENTS SUMMARY. This tab discusses data summarizing user requirements. The data is collected by personal interviews with user supervisors and commander and observation of user activities or product processing.

1. General description of user functions and operation of the required facility. It should be a layman's description of what goes on inside the building, or the function of the plant or system. () ()
2. The User's needs and activities.
 - a. Identify the activity title and current population of each unit (organization). () ()
 - b. Brief description of functions or activities of each unit and capability information (shifts per day, days of operation per week, number of people per shift, etc.); if the facility deals with product processing (such as a dry cleaning plant), describe the process sequence and product production capabilities. () ()
 - c. Space standards. Net square footage per person for each occupied unit, and space requirements for each non-occupied area (storage, files, desk computer space, printer space, and so on) within the same unit of operation, and general support space (conference, food service, equipment, storage, and mainframe computer space). () ()
 - d. Special requirements. For each unit or area, describe the degree of privacy, security, or special access to other areas. Generally work areas are open, without partitions for flexibility; certain supervisors may have a need for semi-private offices, or certain work areas may use systems furniture modules. () ()
 - e. Intra-unit affinities. List the sections having the strongest affinity relationships (considering highest to lowest of all sections, on a scale of three or four divisions). () ()
3. Space.
 - a. If standard modules or definitive drawings are to be used, include them as an attachment. In the case of a site adaptation design, refer to where the design documents may be obtained and include a reduced floor plan. () ()
 - b. Workflow diagrams. For facilities with process lines, list and number the operation sequence (include freehand sketches to depict the process areas containing their respective operations. () ()

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c. Special workstation standards. Include a freehand sketch for each module or individual work area with special controlled environment or special security. () ()

d. Environmental Conditions and Utility Requirements.

(1) List process services or chemicals used in operations (vacuum systems, compressed air, nitrogen, deionized water, liquid oxygen, mixed solvents, acetone, freon, etc.), and state those requiring special drain lines (suction or gravity) or recovery. () ()

(2) List special thermal performance requirements for temperature and relative humidity (average and tolerance range) for each process activity area. State whether centralized or decentralized control is required. () ()

(3) Describe special air quality requirements in terms of ventilation rate, overpressure, or maximum particulates and class of each process area. () ()

(4) Describe vibration isolation requirements for each specific process area or equipment. () ()

(5) Describe special acoustic performance requirements for each area in terms of sound pressure level and frequency, reverberation and absorption, speech privacy or articulation index. () ()

(6) Describe any special acoustic visual performance requirements for each area in terms of ambient and task levels, contrast and brightness ratios, or visual control. () ()

(7) Describe any special facility protection required against chemical attack, biological attack, special weapons, terrorist or special warfare activities, electromagnetic pulse, radio frequency emanations, or other agents that compromise operations. () ()

e. Requirements for warranty response on facility and equipment. Indicate the special user requirements for contractor response to correct a warranty defect, e.g., time to repair an air conditioning unit supporting a computer system. Review all special facility and equipment items in the contract and indicate any warranty items which must be repaired within a specified amount of time to support the user mission. () ()

4. Facility Functional Summary (AF Form 1158). () ()

5. Functional layouts (floor plans or bubble diagrams). () ()

Appendix B: HQ USAF/LEEP Letter, 27 Aug 87



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, D.C.
20330-5130

27 AUG 1987

Colonel David M. Cannon
Dean
School of Civil Engineering
Wright-Patterson AFB, OH 45433

Dear Dave

I have reviewed Captain Michael Stollbrink's thesis, "A Study of User Involvement in the Military Construction Program Process". His research highlights a need for more user participation in the facility acquisition process and he recommended that a users guide be developed. I agree. I believe a good MCP users guide will serve as an excellent reference for our base level customers and engineers and pay for itself by reducing changes on one or two big projects.

Please encourage one of the AFIT graduate students, or one of your instructors, to develop and publish a top quality users manual. Please let us know if we can help in any way.

Sincerely

MICHAEL A. MCNAULIFFE, Colonel, USAF
Chief, Programs Division
Directorate of Engineering & Services

P.S. Mike Stollbrink was a top officer
in the 834 CES when I was the commander.
It's obvious that he has been well trained!

Appendix C: HQ USAF/LEEP Letter, 25 Apr 88



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, D.C. 20330

TO: LEEP
SUBJECT: MILCON User's Guide

25 APR 1988

HQ AAC/DEP/DEE	HQ ATC/DEP/DEE	HQ AFDW/DE
HQ AFCC/DEP/DEE	HQ AU/DEP/DEE	HQ SAC/DEP/DEE
HQ AFLC/DEP/DEE	HQ ESC/DEP/DEE	HQ SPACECMD/DEP/DEE
HQ AFRES/DEP/DEE	HQ MAC/DEP/DEE	HQ TAC/DEP/DEE
HQ AFSC/DEP/DEE	HQ PACAF/DEP/DEE	HQ AFAPC/DE
HQ AFOTEC/DE	HQ AFMPC/MCPDQP	HQ USAFA/DE
HQ AFRCE/ER/CR/WR	HQ AFRCE-BMS/CC	

1. AFIT is conducting research in order to prepare a MILCON User's Guide. We solicit your valuable input. In particular, we are looking for existing written information that will be useful to the MILCON user, the organization that will occupy a facility after it is built. Attachment 1 further explains the focus of this research effort.

2. Please take the time to canvass your files and work areas in order to locate existing written information that may be useful to the development of this User's Guide. Some examples of useful material include:

- a. Supplemental Project book development guidance.
- b. Supplemental MILCON policy.
- c. Supplemental MILCON justification guidance.
- d. Routine correspondence concerning the MILCON.
- e. MILCON guidance sent to base units.
- f. User guidance.

3. Please send this material to 1Lt Neil Whiteman, AFIT/LSG, Wright-Patterson AFB, OH 45433. Please include any personal comments that you feel are appropriate. Please reply by 22 May 88.

4. The data we gather will be synthesized into a MILCON User's Guide. A successful guide should provide a cost savings in avoided change orders. This guide could also improve customer satisfaction. Your participation is completely voluntary, but

your support is vital to the success of this research effort and we would certainly appreciate your help. For further information, please contact 1Lt Whiteman, Commercial 513-434-5583.

Micheal A. McAuliffe
MICHAEL A. McAULIFFE, Colonel, USAF
Chief, Programs Division
Directorate of Engineering & Services

1 Atch
Research Proposal

cc
HQ USAF/LEEPR/LEEPO/LEEPD

This young officer will spend this year working hard on a product which we all hope will help us to better serve our customers. Please take time to support this request — it's important to the success of his efforts. Thanks!

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VITA

Captain Neil S. Whiteman [REDACTED]

[REDACTED] in 1980 [REDACTED]

attended the United States Air Force Academy, from which he received the degree of Bachelor of Science in Civil Engineering in May 1984. Upon graduation, he received a commission in the USAF. His first assignment was as a contract programmer with the 1776th Civil Engineering Squadron, Andrews AFB, Maryland. He also served as the Assistant Chief of the Contract Management Section while at Andrews AFB, until entering the School of Systems and Logistics, Air Force Institute of Technology, in May 1987.

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The purpose of this study was to develop a MILCON User's Guide that could be readily used in the operational Air Force. The guide is intended to reduce the amount of user generated change orders during the design and construction phases of the MILCON process. This can only be accomplished through user education of the MILCON process and increased user involvement during the initial phases of the MILCON process. The MILCON User's Guide should be used to motivate the user to become intensely involved in the MILCON project from the beginning.

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